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Rejection of hearing aid use among Hong Kong elderly

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Abstract

This study examined possible reasons for rejection of hearing aid use among Hong Kong elderly who had both hearing impairment and self perception of hearing handicap/difficulty. Ninety-five Cantonese-speaking participants were identified by pure-tone hearing screening and HHIE-S (Jupiter & Palagonia, 2001) and surveyed by a 51-item questionnaire. Results showed the most prominent reason was that the elderly considered their hearing impairment not so severe as to warrant hearing aid usage. Differences in attitudes towards rejection of hearing aids were found between English-speaking American elderly and Cantonese-speaking elderly, females and males, and among three age groups. Tailor-made counseling advice is suggested to suit individual needs. Greater education on hearing impairment and publicity on the use of hearing aids are also recommended.

Rejection of hearing aid use among Hong Kong elderly

Presbycusis is one of the physical changes associated with late adulthood. This disorder brings elderly people gradual degradation of mid-to-high frequency sound hearing ability and speech discrimination ability (Bee & Boyd, 2002). Such reduction of speech perception and discrimination abilities can adversely affect the quality of conversation, often making communication less effective or unsuccessful. Communication breakdown can be even worse under noisy environments because noise enhances masking effects, which cause further deterioration in the intelligibility of speech signals (Lau & McPherson, 2002). Apart from the impairment caused by presbycusis, the disorder also brings about hearing handicap/difficulty. It has been suggested that hearing loss can lead to psychological and social problems (Bee & Boyd, 2002). Depression and withdrawal from social interaction are examples of behaviours highly associated with hearing loss (Bee & Boyd, 2002; Gate, 2003). Therefore, it is not surprising that Lazarus (1987), as reported by Lau & McPherson (2002), proposed successful conversation and understanding of speech are important and a priori criteria to assure an acceptable quality of life. Moreover, the degree of hearing impairment was found to be one of the predictive variables associated with successful aging among Hong Kong Chinese elderly (Chou and Chi, 2002). By end-2004, provisional figures showed that 12% of the Hong Kong population was composed of elderly people, who were aged 65 or above (Census & Statistic Department, 2005). This implies that about 829,300 Hong Kong elderly are potentially

encountering presbycusis.

As communication is a reciprocal process, the effects of hearing loss are not only brought to people with hearing impairment, but also to their communication partners. Stark and Hickson (2004) applied a modified version of the Quantified Denver Scale (Schow & Nerbonne, 1982) to the significant others of hearing-impaired people to investigate the effects of hearing loss on them. Feeling of frustration, annoyance, and difficulty in conversation under noisy conditions were their major concerns.

Improvement in the quality of life for the hearing-impaired elderly population, and for their communication partners, can be done by minimizing the impact of hearing loss, that is, the degree of hearing handicap/difficulty. Customized hearing aids with appropriate amplification are nearly always beneficial to hearing-impaired individuals (McPherson & Wong, in press) including most elderly people with presbycusis. However, studies showed that only around 20% of the elderly with binaural hearing loss actually use hearing aids (Franks & Beckmann, 1985). Possible reasons for rejection of hearing aid use were investigated in an English-speaking community in the USA (Franks & Beckmann, 1985), whereas no study has been carried out in a Chinese community.

It has been suggested that English speakers and Chinese speakers have different views about hearing impairment and hearing handicap/difficulty. Doyle, Schaefer, Dacakis, and Wong (2002) found out that English-speaking people experienced more hearing difficulties in

communication than Cantonese-speaking people even though the two groups had similar hearing impairment levels. In terms of self-perception of hearing ability among Cantonese speakers, around 83% and 70% participants who failed a 25 dB HTL pure-tone screening test reported that they had no difficulty in conversation, with reference to the studies of Doyle et al. (2002) and Doyle and Wong (1996), respectively. The above studies showed that Cantonese speakers tended to perceive themselves having hearing difficulty in conversation when their mean hearing level reached 40 dB HTL. Furthermore, Wong, Hickson, and McPherson (2004) found that the average hearing level in the better ear for Cantonese-speaking first-time hearing aid users in Hong Kong was 54.3 dB HL, which is similar to findings obtained by Larsen (2001) for first-time Chinese hearing aid users.

Prior to hearing aid fittings, Cantonese-speaking pre-users would adjust their expectations on hearing ability according to different environments, but English ones would not (Cox & Alexander, 2002 in Wong et al., 2004). Besides, the Chinese showed a lower expectation on potential problems related to hearing aids and dispenser service, which was unlike their American counterparts. They also mostly underestimated hearing aid cost and repair cost (Wong et al., 2004). In addition, Larsen (2001) added that 50% of the hearing aid clients in the territory were of relatively low socioeconomic class. Should there be cultural, psychosocial, and socioeconomic differences between English-speaking community and Chinese-speaking community groups, it is probable that Cantonese potential hearing aid users

(i.e., Chinese elderly) have dissimilar attitudes towards hearing aid use from the English-speaking ones. Thus, a hypothesis can be established that Chinese elderly will have different attitudes for rejection of hearing aid use from English-speaking elderly residing in Western countries.

Frank and Beckmann (1985) investigated possible reasons for rejection of hearing aid use among American elderly, in which the participants were asked to complete a questionnaire of possible reasons using a 7-point rating scale. The study included four groups of subjects: i) elderly with normal hearing, ii) elderly who had never worn a hearing aid and were considered as *not* perceiving themselves having hearing impairment, iii) elderly who had worn a hearing aid at least a month but were no longer using it, and iv) elderly who were currently using a hearing aid. The four groups of candidates in Frank and Beckmann (1985) did not include a group of elderly people who have self-perceived hearing handicap/difficulty *and* who have never worn hearing aids. This is actually a particular group of interest for audiologists or speech therapists to learn the attitudes for those elderly people with self-perceived hearing handicap/disability but who reject hearing aid use.

Weinstein (1986), as reported by Jupiter & Palagonia (2001), suggested that two measures, i.e., the Hearing Handicap Inventory for the Elderly-Screening (HHIE-S) and pure-tone hearing screening at 40 dB HL, can allow specialists to identify persons who have both hearing impairment and self perception of hearing handicap/difficulty. In addition, a global

question “Do you feel you have a hearing problem now?” (Gates, 2003; Uchida, Nakashima, Ando, Niino, & Shimokata, 2003) can give an overall perception of the self-rated hearing ability of the elderly. The above measures can serve as useful tools to screen Chinese elderly people who have hearing impairment and self-perceived hearing handicap/difficulty.

Any similarities and/or differences of reasons for rejection of hearing aid use between American elderly and Chinese elderly can be investigated through comparing the study from Franks and Beckmann (1985) and the current study. In addition, attitudes for different genders, i.e., female versus male, different age groups, i.e., young old (65-75), old old (75-85) and oldest old (85 or above) (Bee & Boyd, 2002), and different types of hearing loss, i.e., unilaterally versus bilaterally hearing-impaired, can also be examined. With knowledge of the potential reasons for rejection of hearing aid use among Chinese elderly people who have hearing impairment and already have self-perceived hearing handicap/difficulty, specialists can learn how to work on relieving the reluctance of hearing aid use for those elderly who can actually benefit from hearing aids, and develop better educational programs for the elderly population and the public that showed the benefits of the amplification devices.

Method

Centers for the elderly

Eleven centers for the elderly were included in the study, in which three were located in Hong Kong Island, four were in Kowloon and another four were in the New Territories.

Centers for the elderly were firstly contacted by phone. Application letters were then sent to the centers which showed interest in the study. The letters included information about the purpose of the study, the criteria for subject recruitment, the procedures and the amount of time needed for data collection. After data collection, the centers were given a summary report of the participants' hearing ability and leaflets about hearing aids for reference.

Participants

A total of 308 Chinese elderly were invited to participate in the study, including 150 females and 158 males. They were approached individually by the author with the consent of the centers for the elderly.

To be included in the study, participants were required to be aged 65 or above, native Cantonese-speaking, without speech/language and cognitive problem, not wearing hearing aids currently and have no experience of wearing hearing aids. Objectively, they had to have failed the pure-tone air-conduction hearing screening at 1000, 2000 and 4000 Hz at 40dB HL in one ear or in both ears, and scored more than ten marks in the Chinese version of the Hearing Handicap Inventory for the Elderly-Screening (HHIE-S) (Jupiter & Palagonia, 2001). A follow-up questionnaire interview was then given to the eligible participants to investigate the possible reasons for rejection of hearing aid use.

Of the 308 Chinese elderly screened, 95 participants were eligible to take part in the study, 50 females and 45 males. The age range of the participants was 65-92 years (M = 76.4,

SD = 7.1), in which 39, 45 and 11 participants were considered as “young old”, “old old”, and “oldest old” respectively (Bee & Boyd, 2002). Seventy-seven participants failed the hearing screening at 1000, 2000, and 4000 Hz at 40dB bilaterally whereas 18 participants failed the hearing screening unilaterally. Their range of HHIE-S score was 12 to 40 (*M* = 20.15, *SD* = 6.87). For their general perception of hearing ability, 82 participants responded positively and 13 participants responded negatively to the global question. Within the 95 participants, 52.6% (50/95) of them had a monthly income below $2000, whereas 34.7% (33/95) had a monthly income of $2000-3000, 6.3% (6/95) had a monthly income of $3000-4000 and 6.3% (6/95) had a monthly income of $4000 or above. Most elderly reported their main source of income was the Normal/Higher Old Age Allowance ($625/$705) under the Social Security Allowance Scheme, which was granted for elderly aged 65 or above (Social Welfare Department, 2005). Other possible sources might include Normal/Higher Disability Allowance ($1120/$2240), Comprehensive Social Security Assistance (CSSA), and money from their children.

The excluded participants contained seven persons whose ages were not equal to or above 65, three elderly who were not native Cantonese speakers, seventeen elderly who were currently wearing hearing aids or had used hearing aids, five elderly who failed to respond to the hearing screening and questionnaire properly, one elderly was already considering hearing aids, forty-five elderly who passed the 40 dB pure-tone hearing screening, and one-hundred thirty-five elderly persons who failed hearing screening but scored equal or less than ten in

the HHIE-S (Jupiter & Palagonia, 2001). In total 43.8% of the total potential participants were excluded from the study.

Materials

A questionnaire with 51 possible reasons for rejection of hearing aid use was developed with reference to the questionnaire of Franks and Beckmann (1985), literature reviews and clinical practice from the author. It was first generated in English and then translated into Chinese. Back translation was done by a university student and a Speech and Hearing Sciences (SHS) student who had no prior knowledge of the study. The questionnaire items were revised subsequently by the author and the SHS student after review (Guillemin, Bombardier, & Beaton, 1993). A 5-point rating scale was adopted and the points were 0 for no comment; 1 for strongly disagree; 2 for disagree; 3 for agree; and 4 for strongly agree.

The Hearing Handicap Inventory for the Elderly-Screening (HHIE-S) in Chinese Version (Jupiter & Palagonia, 2001) was applied to evaluate individual hearing handicap/difficulty. This was requested and obtained via mail with the consent of Dr. Jupiter.

Pure-tone hearing screening was conducted in a quiet room with low background noise in each centre for the elderly. A portable audiometer (Madsen Micromate 304) equipped with noise-excluding circumaural headphones was used in the testing.

Procedure

All participants were approached in the quietest possible rooms arranged by the centers.

Information about the study was given and each participant was asked to sign a consent form to allow the release of results for research purposes. Background noise levels of the quietest possible rooms were measured with a CESVA SC-30 sound level meter.

A free-of-charge pure-tone hearing screening at 1000, 2000, and 4000 Hz at 40 dB was conducted for all participants individually, followed by answering the HHIE-S and the global question. Administration of the HHIE-S and the global question was counterbalanced to avoid an order effect bias. Participants who failed the pure-tone hearing screening at 1000, 2000, and 4000 Hz at 40 dB HL unilaterally or bilaterally and had a HHIE-S score of more than ten were given a follow-up questionnaire interview. The eligible participants were asked to respond to each of the possible reasons in the questionnaire presented verbally by the interviewee, i.e., the author. The questionnaire items were asked in a cause-effect manner, e.g., "As hearing aids are expensive, you dislike/reject hearing aid use."

Debriefing of the hearing screening results and recommendations (e.g., detailed hearing assessment, use of hearing aids) were provided for all participants individually after the interview for their reference.

Results

Background Noise Levels in the Quietest Possible Rooms

The background noise levels in the quietest possible rooms of the centers for the elderly were measured (see Appendix A). Measurement of the noise levels was not carried out in two

of the eleven centers as they were under decoration during the re-visit. The mean background noise level was 37.2 dBA with a range from 31.1 to 43.8 dBA.

Reasons for rejection of hearing aid use

The overall ranked questionnaire items among 95 participants and the percentages (correct to digit) indicating proportional responses (negative, positive, and no comment) by the participants for each reason are summarized in Table 1. Such ranking of possible reasons for rejection of hearing aid use among Chinese elderly people was achieved by computing the mean score of each reason, i.e. the sum of the rating scores of the reason divided by the number of participants giving negative and positive responses, and arranging the mean scores of the 51 items in descending order. Negative response includes ratings (1) Strongly Disagree and (2) Disagree, whereas positive response includes ratings (3) Agree and (4) Strongly Agree. Participants who rated no comment (0) were deducted in calculation according to each reason. The distribution of ratings among the top ten reasons ranked by the 95 participants is shown in Figure 1.

Table 1.

Ranked Reasons for Rejection of Hearing aid use among 95 Participants.

Rank	Mean	Reason (Questionnaire item)	-ve	+ve	0
1	3.442	You do not think aids needed. (22)	7%	93%	0%
2	3.295	Hearing aids are only for most severe problems. (32)	8%	92%	0%

3	2.968	You think hearing impairment is normal for elderly. (51)	18%	81%	1%
4	2.806	Another ear can help hearing. (50)	36%	62%	2%
5	2.696	You cannot afford to buy a hearing aid. (28)	45%	52%	3%
6	2.690	Hearing aids are troublesome to use wear. (6)	46%	46%	8%
7	2.656	Hearing aids are inconvenient to wear. (4)	44%	51%	5%
8	2.639	Hearing aids are uncomfortable to wear. (5)	44%	43%	13%
9	2.598	Hearing aids are expensive. (1)	52%	45%	3%
10	2.455	Hearing aids will bring feedback. (12)	42%	27%	31%
11	2.448	Hearing aids will bring noise annoyance. (14)	43%	27%	30%
12	2.377	Hearing aids will make sounds unnatural. (13)	44%	28%	28%
13	2.373	Hearing aids will make sounds too loud and bring discomfort. (11)	51%	28%	21%
14	2.319	Hearing impairment is not a serious medical problem. (46)	56%	43%	1%
15	2.289	Hearing aids are difficult to manipulate. (7)	54%	26%	20%
16	2.274	Hearing aids often have malfunction. (10)	55%	22%	23%
17	2.269	You think you will not live long enough. (47)	65%	33%	2%
18a	2.250	You are afraid of making wrong choice. (21)	69%	28%	3%
18b	2.250	Hearing aids can only be used in particular	60%	20%	20%

		environments. (15)			
20	2.246	Doctor does not think aids needed. (25)	51%	22%	27%
21	2.231	You do not know how to choose a suitable one. (18)	66%	30%	4%
22	2.211	Hearing aids require expensive repair cost. (9)	59%	21%	20%
23	2.200	You do not know how to manipulate. (20)	70%	25%	5%
24	2.192	Hearing aids have inflexible volume control. (16)	61%	21%	18%
25	2.189	Hearing aids are small and easy to lose. (2)	71%	24%	5%
26	2.183	You do not know where to buy. (19)	75%	23%	2%
27	2.165	Hearing aids require expensive battery. (8)	63%	20%	17%
28	2.146	You have heard about poor experience from others using hearing aids. (40)	70%	16%	14%
29	2.089	Difficult to reach a hearing centre. (48)	78%	17%	5%
30	2.088	Your family does not think aids needed. (23)	75%	21%	4%
31	2.085	Wearing hearing aids will make you feel nervous. (49)	70%	16%	14%
32	2.082	Dispensers are not professional enough. (42)	73%	17%	10%
33	2.068	You think words are still unclear after wearing hearing aids. (27)	61%	17%	22%
34	2.059	There is insufficient information/instruction given by dispensers (in store). (41)	73%	17%	10%

35	2.048	Dispensers' service is not good. (43)	74%	15%	11%
36	2.047	Dispensers use deceptive practice. (45)	76%	14%	10%
37	2.029	Wearing hearing aids can cause other ailments. (17)	62%	11%	27%
38	2.024	Dispensers use high pressure of selling. (44)	78%	12%	10%
39	1.989	Your friends do not think aids needed. (24)	84%	13%	3%
40	1.987	You do not think hearing aids can help. (26)	70%	13%	17%
41	1.968	Wearing hearing aids is a sign of handicap. (31)	84%	15%	1%
42	1.936	Wearing hearing aids will make you feel inferior to other elderly. (34)	83%	16%	1%
43	1.926	Wearing hearing aids is a sign of weakness. (30)	87%	12%	1%
44a	1.915	Wearing hearing aids is a sign of aging. (29)	88%	11%	1%
44b	1.915	You do not want to disclose having hearing impairment. (33)	84%	15%	1%
46	1.890	Hearing aids are not good-looking. (3)	86%	10%	4%
47a	1.840	You worry family will think you are inferior after using. (35)	87%	12%	1%
47b	1.840	You worry friends will think you are inferior after using. (36)	87%	12%	1%
49	1.777	Wearing hearing aids will make you feel ashamed. (37)	90%	9%	1%

50	1.755	You worry wearing hearing aids will make your family feel ashamed. (38)	93%	6%	1%
51	1.745	You worry wearing hearing aids will make your friends feel ashamed. (39)	93%	6%	1%

Key: +ve = Positive response; -ve = Negative response; 0 = No Comment.

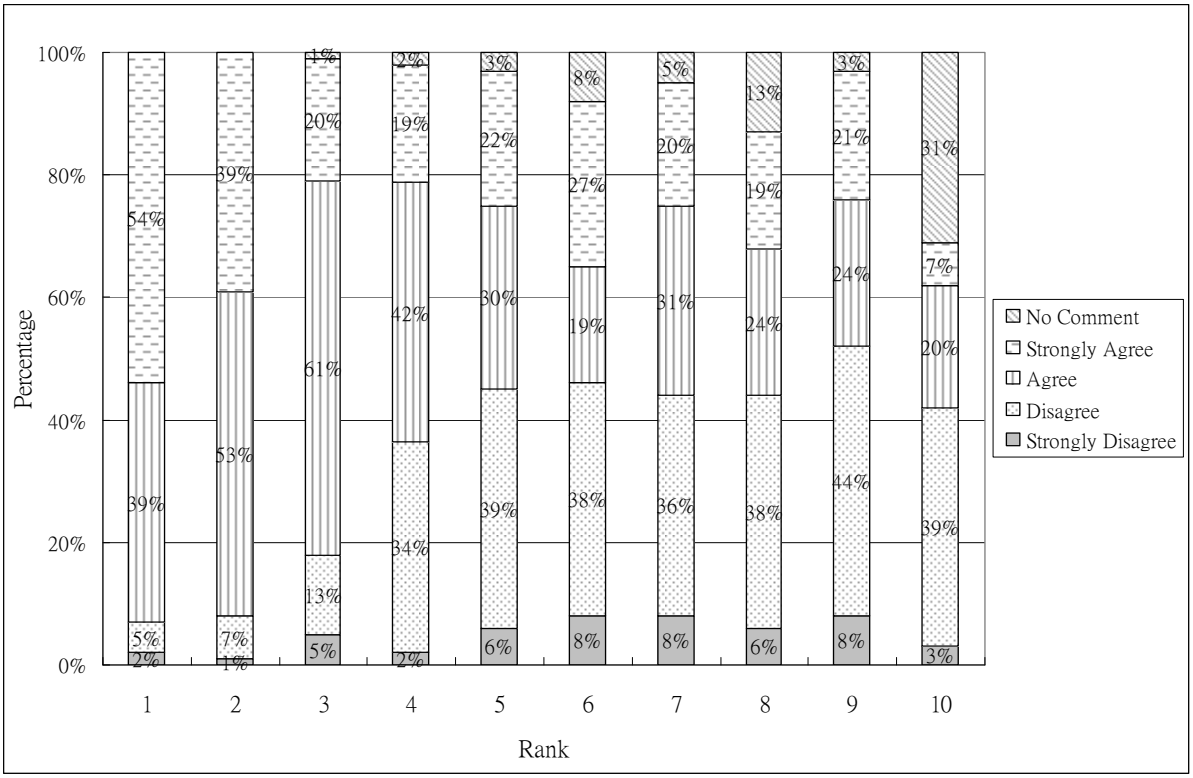

Figure 1. Distribution of ratings among the top ten reasons by 95 participants

Results showed that most of the Hong Kong elderly with self-perceived hearing handicap/difficulty considered that they did not think they needed hearing aids at present, although they had hearing loss. They believed that hearing aids were only essential for people with the most severe hearing impairment. Besides, they considered hearing loss was a normal process when getting older. Some elderly people agreed that they rejected hearing aid use

because they could rely on and gain help from a better hearing ear, whether it had normal hearing ability or only residual hearing ability. In addition, financial status was considered another issue. Some elderly reported they could not afford a hearing aid and hearing aids were expensive for them. Other reasons ranked within the top ten included potential problems related to wearing hearing aids, including trouble, inconvenience, discomfort, and feedback while using a hearing aid.

Between group comparisons

Gender: The ranked reasons for rejection of hearing aid use and their corresponding percentages of responses (negative, positive, and no comment) for females and males are presented (Appendixes B1 and B2). A Mann-Whitney U test was used to compare the results and a significant difference between female and male rating scores was found (U = 958, Z = -2.292, P = 0.022). The distributions of ratings among the top ten reasons for female and male participants are presented in Appendixes C1 and C2.

Age: The ranked reasons for rejection of hearing aid use and their corresponding percentages of responses for the young old, old old, and the oldest old groups are presented in Appendixes B3, B4, and B5. A Kruskal-Wallis test found a significant difference among the three age group rating scores (x^2 = 6.182, df = 2, P = 0.045). For the rating distributions among the top ten reasons for the three age groups, refer to Appendixes C3, C4, and C5.

Types of hearing loss: The ranked reasons for rejection of hearing aid use and their

corresponding percentages of responses for unilaterally and bilaterally hearing-impaired elderly are presented in Appendixes B6 and B7. A Mann-Whitney U test was used to compare the results and no significant difference was found between unilateral hearing loss and bilateral hearing loss rating scores (U = 1158.5, Z = -0.950, P = 0.342). The rating distributions within the top ten reasons for the unilaterally and bilaterally hearing-impaired groups are presented in Appendixes C6 and C7.

Discussion

The background noise levels in the quietest possible rooms of the centers for the elderly in this study were lower when compared with the results obtained in Lau and McPherson (2002), who found an average overall noise level of 49.4 dBA. This was most possibly due to the fact that the centers in the current study agreed to specially arrange rooms with the lowest background noise for the purpose of hearing screening. With low background noise and the use of noise-excluding circumaural headphones, the hearing screening program was found to have validity when evaluated using ANSI S3.1-1999 maximum permissible ambient noise level standards for pure tone audiometry (American National Standards Institute, 1999).

According to the ranking of questionnaire items in the current study, the majority of the self-perceived hearing handicap/difficulty participants rejected the idea of hearing aid use because they considered their degree of hearing impairment not so severe that a hearing aid was necessarily required. They mistakenly believed that hearing aids were only important for

the most severe hearing problems. Even if elderly people had difficulty in hearing and understanding speech, over 60% of participants were still reluctant to use it because they thought they could rely on and gain help from another ear, whether the ear had normal hearing ability or had only residual hearing ability. On the other hand, it was interesting to see that more than half of the participants did consider that having hearing impairment or unclear listening was a serious medical problem and that it could affect daily activities. Besides, nearly 70% of participants did believe that hearing aids could help. They, however, still preferred not using this useful and helpful amplification device. From their point of view, should they have enough residual or sufficient hearing ability for them to communicate, they would choose not to seek help from the device. Most participants added that they would ignore speakers' speech, ask for clarification or louder voice from their communication partners when they had difficulty in hearing during conversation. Thus, compensatory strategies have become their alternative means, rather than hearing aids, to cope with hearing handicap/difficulty.

The above findings reflected that most Hong Kong elderly are not motivated to seek help until they find their hearing problems become worse and harder to ignore, as noticed in Doyle et al. (2002), Doyle & Wong (1996), and Larsen (2001). Besides, more than 80% of the participants believed having hearing loss or unclear listening was normal or natural while aging and so rejected hearing aid use. As a matter of fact, the belief that presbycusis was

inevitable might somehow hinder their initiatives to seek external help and therefore prevent them from gaining benefit from hearing aids.

The results also revealed that financial status was another concern for the elderly. In the study, nearly 90% of the participants had a reported monthly income below $3000 and the medium monthly income was below $2000. Financial assistance from the government has become their main source of income. As reported by Larsen (2001), half of the hearing aid users in Hong Kong had relatively low socioeconomic class. Hence, hearing aids could really be unaffordable or expensive for some elderly in the territory. Furthermore, it was noted about half of the participants were concerned about the potential problems brought from wearing hearing aids. They thought that hearing aids could be troublesome, inconvenient and uncomfortable. This reflected that rejection of hearing aid use among Hong Kong elderly could be affected by their subjective perception of wearing hearing aids. On the other hand, potential problems related to hearing aid itself were comparatively less important than the subjective perception. Elderly people seemed to pay less attention to possible feedback, noise annoyance, sounding unnatural, and sounding uncomfortably loud. Besides, quite a number of the elderly had no opinion on these questionnaire items. This mainly resulted from their not yet using or considerating factors in hearing aid use. The elderly who did respond to these items generally reported that such potential problems were not their concern. On the contrary, they restated that whether or not they think they need aids was the primary factor in rejecting

hearing aid use.

The results also showed that most Hong Kong elderly would not reject hearing aid use because of the influence of self image and/or opinions from their family and friends. They would not feel ashamed or inferior by disclosing their hearing loss and wearing hearing aids. And their resistance of using hearing aids was not due to hearing aids being considered signs of weakness, aging or handicap. The elderly added that whether to get a hearing aid or not was their own matter, which was a personal issue. More than a half participants even stated they would not depend on advice from doctors to decide if they should wear a hearing aid. Even if doctors did not think hearing aids were needed, the elderly would still seek help when they thought hearing aids were necessary. But it was worth noting that about 20% of the participants rejected hearing aid use entirely because of recommendations from doctors. Reports on self-perceived difficulties in hearing and understanding speech by the elderly were explained in terms of “normal” aging effects. This could indirectly affect their initiatives to seek help from hearing aids. In addition, nearly 30% participants had no comment on the doctor item and they reported that they had not received any advice from doctors. Such phenomenon was possibly due to lack of consultation on hearing difficulty with doctors or limited knowledge on the means to seek help. This could also reflect that Hong Kong doctors have a limited awareness of communication disorders in the elderly and ignore hearing problems which bring supplementary hearing handicap/difficulty to the elderly.

Compared with rankings in the study of Franks and Beckham (1985), there were differences of attitudes or reasons on rejection of hearing aid use among elderly people in the English-speaking American community and the Chinese-speaking community in Hong Kong. To begin with, cost was found to be the major concern for the English-speaking elderly but whether they could afford to buy a hearing aid was ranked relatively lower when compared with the current study. It seemed that, in terms of financial status, the American elderly subjects had the ability to buy a hearing aid, but they chose not to buy because of the high cost. This was a different attitude from the Chinese counterparts who were negatively affected by affordability issues rather than cost. The relatively lower socioeconomic class of Hong Kong elderly did play a role on decision making regarding hearing aid consideration. Additionally, items related to “dispenser service” were ranked higher and within the top ten in the American study, whereas the dispenser-related items were ranked comparatively lower in the current study. Both Chinese- and English-speaking elderly were also concerned about potential problems related to hearing aids, but relatively more American participants responded positively to survey items related to the potential problems of a hearing aid itself, like noise annoyance and loudness comfort. These findings were consistent with the results in Wong et al. (2004), which suggested that Cantonese-speaking pre-users had a lower expectation regarding problems related to hearing aids and dispenser service than English-speaking pre-users. In addition, English-speaking elderly were very concerned about

the helpfulness of hearing aids and worried about signs of handicap when wearing hearing aids. Finally, fewer American elderly thought hearing aids were only for the most severe hearing problems. This might be related to differences in education and general awareness of hearing aids between the two communities. Provided that there are cultural, psychosocial and socioeconomic differences between the American community and the Hong Kong community, it was valid to conclude Chinese elderly have different attitudes on reasons for the rejection of hearing aid use than the American elderly in the Franks and Beckham (1985) study.

The results showed there was a significant difference between female and male participants regarding reasons for the rejection of hearing aid use. With reference to their rankings (see Appendixes B1 and B2), more female participants tended to reject hearing aid use because they thought hearing impairment was normal when aging and they could seek help from another ear. They demonstrated more worry than males about repair cost, efficacy, and potential problems of hearing aids such as “feedback”, “sound to loud”, “difficult to manipulate”, and “easy to lose”. Females were also more worried that they would feel nervous when wearing hearing aids. Poor experiences reported by others seemed to impact relatively more on females’ decision making than on males. Poor experience reports was possibly due to inappropriate hearing aid use by some elderly people and/or inappropriate hearing aids being used (Cheng & McPherson, 2000). On the other hand, it was noted that males were much concerned about disperser service than psychosocial stigmata related to

hearing aids like weakness and handicap. This was opposite to the ranking order noted with female subjects. The unimportance of perceived signs of weakness by the Hong Kong male elderly was contradictory to what audiologists may generally think. Carmen (2005) reported that audiologists have been suspecting greater resistance to hearing aid use in males rather than females was due to a higher prevalence of the belief that hearing aids are a sign of weakness. Males tended to consider opinions from doctors relatively more often than females, and they showed more concern about making a wrong choice. They also had higher ranking for the reason “hearing impairment is not a serious medical problem”. It implied that males might have higher chances of rejecting hearing aid use than females because of their underestimation of the seriousness of hearing loss. Although the results could not determine which gender was more reluctant to wear hearing aids, it was possible to conclude that females and males have different attitudes towards rejection of hearing aid use.

A significant difference was also found among age groups. The oldest old group was found to be much more concerned about their longevity, the hearing aid selection process, the helpfulness of hearing aids, whether the hearing aid was comfortable or not, and signs of aging, weakness and handicap. They seemed to pay less attention to the seriousness of hearing loss, advice from doctors, the potential problems of hearing aids, and dispenser services. But the oldest old appeared to show relatively more realistic conceptions regarding hearing aids when compared with the other two groups. They generally disagreed that hearing

aids could be used only in particular areas and hearing aids could cause other aliments. For the young old, they were found to pay closer attention to dispenser-related items such as professionalism and customer service, and to opinions from doctors and family. Besides, they were not worried they would lose the hearing aid because of its small size. Such a worry for the old old and the oldest old groups might be related to their self-perception of potential memory deterioration when getting old. Unlike the young old and the oldest old, the old old were relatively aware of the seriousness of hearing loss. It seemed that elderly are likely to deny the seriousness of the problem when they get into late adulthood and at the later stage of late adulthood. From this, it was concluded that the old old are the most likely hearing aid candidates if they are alerted to the rehabilitation options for their hearing problems. The study showed that elderly from different age groups have their own concerns on hearing aid use and their own set of attitudes towards hearing aid use or rejection of hearing aids.

Unilaterally and bilaterally hearing-impaired elderly demonstrated no significant difference between their general rankings. Such absence of difference under inferential analysis might be related to unequal sample size of the two hearing-impaired groups (i.e., 18 unilateral versus 77 bilateral), which was one of the limitations in the study. But it was worthy of notice that the elderly with unilateral hearing loss ranked “Another ear can help” as their top 2 compared to the top 6 ranking of the bilateral hearing impaired group (Appendixes B6 and B7). Besides, their rejection of hearing aids was not due to unaffordable cost. This

showed that the unilaterally hearing impaired elderly were aware of their current hearing ability and could realistically evaluate whether they were in need of hearing aids or not.

This study has some other limitations. To start with, in order to examine if the elderly had self perception of hearing handicap/difficulty, HHIE-S (Jupiter & Palagonia, 2001) was used to screen the participants. During data collection, however, it was found that some elderly were living alone and so they would score zero for the two items related to family in HHIE-S. Those elderly were then excluded if their total score was not over ten. Thus, the use of HHIE-S might restrict eligible elderly from taking part in the research. Besides, participants being recruited in this study were attending centers for the elderly and most of them had typically low income level. The results might not truly reflect the attitudes towards hearing aid use among elderly people who were not that socially active or who had higher economic level. Moreover, education level was not a factor being controlled. The elderly who have different levels of education might have different opinions on the hearing aid issue. Lastly, although 51 possible reasons were examined in the study (refer to Appendix D for Chinese version), it was possible that there were still some other undisclosed rationales for the rejection of hearing aids.

Conclusion

The study investigated the possible reasons for the rejection of hearing aid use among Hong Kong elderly people and found that the most frequent reason was that they found their

hearing impairment not so severe as to warrant hearing aid usage. Practically, the delayed use of hearing aids might be related to the current audiological service available, limited public knowledge of hearing loss and hearing aids, and the low level of publicity regarding hearing aid use in the territory (Larsen, 2001). Misconceptions of hearing aids can also hinder eligible hearing aid pre-users from gaining hearing aid benefits. Education of the public, including audiological services available (e.g., audiologists, hearing assessment, hearing centers), hearing loss, hearing aids, and clarification of misconceptions about hearing aids (e.g., that hearing aids can also benefit people with mild and moderate hearing loss), is strongly recommended. Besides, different counseling strategies are suggested to resolve queries and worries of the elderly according to their gender and age group so that benefit of hearing aids can be widely achieved.

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Appendix A

Background Noise Levels in the Quietest Possible Rooms.

Center for the elderly	Location	Background Noise Level (dBA)
A	HKI	33.9
B	HKI	42.4
C	KLN	34.8
D	KLN	35.4
E	KLN	40.5
F	KLN	31.1
G	NT	32.9
H	NT	43.8
I	NT	40.0

Key: HKI = Hong Kong Island; KLN = Kowloon; NT = New Territories.

Appendix B1

Ranked Reasons for Rejection of Hearing aid use among Female Participants.

Rank	Mean	Reason (Questionnaire item)	-ve	+ve	0
1	3.360	You do not think aids needed. (22)	10%	90%	0%
2	3.320	Hearing aids are only for most severe problems. (32)	6%	94%	0%
3	3.122	You think hearing impairment is normal for elderly. (51)	8%	90%	2%
4	2.958	Another ear can help hearing. (50)	22%	74%	4%
5	2.950	Hearing aids are uncomfortable to wear. (5)	28%	52%	20%
6	2.940	You cannot afford to buy a hearing aid. (28)	34%	66%	0%
7	2.907	Hearing aids are troublesome to use wear. (6)	32%	54%	14%
8	2.889	Hearing aids are inconvenient to wear. (4)	28%	62%	10%
9	2.820	Hearing aids are expensive. (1)	42%	58%	0%
10	2.618	Hearing aids will bring feedback. (12)	34%	34%	32%
11	2.600	Hearing aids will bring noise annoyance. (14)	40%	30%	30%
12	2.579	Hearing aids will make sounds too loud and bring discomfort. (11)	38%	38%	24%
13	2.441	Hearing aids will make sounds unnatural. (13)	36%	32%	32%
14	2.439	Hearing aids are difficult to manipulate. (7)	46%	36%	18%
15	2.389	Hearing aids often have malfunction. (10)	44%	28%	28%

16	2.354	You think you will not live long enough. (47)	60%	36%	4%
17	2.351	Hearing aids require expensive repair cost. (9)	46%	28%	26%
18	2.350	Hearing aids can only be used in particular environments. (15)	52%	28%	20%
19	2.348	Hearing aids are small and easy to lose. (2)	60%	32%	8%
20	2.340	Hearing impairment is not a serious medical problem. (46)	54%	46%	0%
21	2.300	Hearing aids have inflexible volume control. (16)	54%	26%	20%
22	2.289	You have heard about poor experience from others using hearing aids. (40)	70%	20%	10%
23a	2.277	You do not know how to choose a suitable one. (18)	68%	26%	6%
23b	2.277	You are afraid of making wrong choice. (21)	70%	24%	6%
25	2.270	Hearing aids require expensive battery. (8)	50%	24%	26%
26	2.261	You do not know how to manipulate. (20)	64%	28%	8%
27	2.231	You think words are still unclear after wearing hearing aids. (27)	52%	26%	22%
28	2.220	Wearing hearing aids will make you feel nervous. (49)	64%	18%	18%
29	2.167	You do not know where to buy. (19)	76%	20%	4%
30	2.146	Doctor does not think aids needed. (25)	62%	20%	18%

31	2.109	Difficult to reach a hearing centre. (48)	74%	18%	8%
32	2.102	Wearing hearing aids is a sign of handicap. (31)	80%	18%	2%
33	2.098	You do not think hearing aids can help. (26)	66%	16%	18%
34	2.087	Your family does not think aids needed. (23)	76%	16%	8%
35	2.083	Your friends do not think aids needed. (24)	78%	18%	4%
36	2.067	Wearing hearing aids can cause other ailments. (17)	50%	10%	40%
37	2.061	Wearing hearing aids is a sign of weakness. (30)	84%	14%	2%
38	2.044	Dispensers are not professional enough. (42)	74%	16%	10%
39	2.041	Wearing hearing aids is a sign of aging. (29)	86%	12%	2%
40	2.023	Dispensers' service is not good. (43)	74%	14%	12%
41a	2.022	There is insufficient information/instruction given by dispensers (in store). (41)	74%	16%	10%
41b	2.022	Dispensers use high pressure of selling. (44)	78%	12%	10%
41c	2.022	Dispensers use deceptive practice. (45)	78%	12%	10%
44	2.000	Wearing hearing aids will make you feel inferior to other elderly. (34)	84%	14%	2%
45	1.957	Hearing aids are not good-looking. (3)	82%	12%	6%
46a	1.857	You do not want to disclose having hearing impairment. (33)	86%	12%	2%

46b	1.857	You worry friends will think you are inferior after using. (36)	90%	8%	2%
48a	1.837	Wearing hearing aids will make you feel ashamed. (37)	90%	8%	2%
48b	1.837	You worry family will think you are inferior after using. (35)	90%	8%	2%
50	1.796	You worry wearing hearing aids will make your family feel ashamed. (38)	92%	6%	2%
51	1.776	You worry wearing hearing aids will make your friends feel ashamed. (39)	92%	6%	2%

Key: +ve = Positive response; -ve = Negative response; 0 = No Comment.

Appendix B2

Ranked Reasons for Rejection of Hearing aid use among Male Participants.

Rank	Mean	Reason (Questionnaire item)	-ve	+ve	0
1	3.533	You do not think aids needed. (22)	4%	96%	0%
2	3.276	Hearing aids are only for most severe problems. (32)	11%	89%	0%
3	2.800	You think hearing impairment is normal for elderly. (51)	29%	71%	0%
4	2.644	Another ear can help hearing. (50)	51%	49%	0%
5	2.477	Hearing aids are troublesome to use wear. (6)	62%	36%	2%
6	2.422	Hearing aids are inconvenient to wear. (4)	62%	38%	0%
7	2.405	You cannot afford to buy a hearing aid. (28)	58%	35%	7%
8	2.393	Doctor does not think aids needed. (25)	38%	24%	38%
9	2.349	Hearing aids are uncomfortable to wear. (5)	62%	33%	5%
10	2.333	Hearing aids are expensive. (1)	62%	31%	7%
11	2.314	Hearing aids will make sounds unnatural. (13)	54%	24%	22%
12	2.295	Hearing impairment is not a serious medical problem. (46)	58%	40%	2%
13a	2.281	Hearing aids will bring feedback. (12)	51%	20%	29%
13b	2.281	Hearing aids will bring noise annoyance. (14)	47%	24%	29%

15	2.222	You are afraid of making wrong choice. (21)	67%	33%	0%
16	2.200	You do not know where to buy. (19)	73%	27%	0%
17	2.182	You do not know how to choose a suitable one. (18)	65%	33%	2%
18	2.178	You think you will not live long enough. (47)	71%	29%	0%
19a	2.162	Hearing aids will make sounds too loud and bring discomfort. (11)	64%	18%	18%
19b	2.162	Hearing aids often have malfunction. (10)	67%	15%	18%
21	2.139	Hearing aids can only be used in particular environments. (15)	69%	11%	20%
22	2.136	You do not know how to manipulate. (20)	76%	22%	2%
23	2.125	Dispensers are not professional enough. (42)	71%	18%	11%
24	2.114	Hearing aids are difficult to manipulate. (7)	62%	16%	22%
25	2.100	There is insufficient information/instruction given by dispensers (in store). (41)	71%	18%	11%
26	2.089	Your family does not think aids needed. (23)	73%	27%	0%
27	2.079	Hearing aids have inflexible volume control. (16)	70%	15%	15%
28	2.077	Hearing aids require expensive repair cost. (9)	74%	13%	13%
29a	2.075	Dispensers’ service is not good. (43)	73%	16%	11%
29b	2.075	Dispensers use deceptive practice. (45)	73%	16%	11%

31	2.071	Hearing aids require expensive battery. (8)	78%	15%	7%
32	2.068	Difficult to reach a hearing centre. (48)	82%	16%	2%
33	2.025	Dispensers use high pressure of selling. (44)	78%	11%	11%
34	2.023	Hearing aids are small and easy to lose. (2)	82%	16%	2%
35	2.000	Wearing hearing aids can cause other ailments. (17)	76%	11%	13%
36	1.978	You do not want to disclose having hearing impairment. (33)	82%	18%	0%
37	1.973	You have heard about poor experience from others using hearing aids. (40)	71%	11%	18%
38	1.951	Wearing hearing aids will make you feel nervous. (49)	78%	13%	9%
39a	1.886	Your friends do not think aids needed. (24)	91%	7%	2%
39b	1.886	You think words are still unclear after wearing hearing aids. (27)	71%	7%	22%
41	1.868	You do not think hearing aids can help. (26)	75%	10%	15%
42	1.867	Wearing hearing aids will make you feel inferior to other elderly. (34)	82%	18%	0%
43	1.844	You worry family will think you are inferior after using. (35)	84%	16%	0%
44a	1.822	You worry friends will think you are inferior after	84%	16%	0%

		using. (36)			
44b	1.822	Wearing hearing aids is a sign of handicap. (31)	89%	11%	0%
46	1.818	Hearing aids are not good-looking. (3)	91%	7%	2%
47a	1.778	Wearing hearing aids is a sign of aging. (29)	91%	9%	0%
47b	1.778	Wearing hearing aids is a sign of weakness. (30)	91%	9%	0%
49a	1.711	Wearing hearing aids will make you feel ashamed. (37)	89%	11%	0%
49b	1.711	You worry wearing hearing aids will make your family feel ashamed. (38)	93%	7%	0%
49c	1.711	You worry wearing hearing aids will make your friends feel ashamed. (39)	93%	7%	0%

Key: +ve = Positive response; -ve = Negative response; 0 = No Comment.

Appendix B3

Ranked Reasons for Rejection of Hearing aid use among the Young Old Participants.

Rank	Mean	Reason (Questionnaire item)	-ve	+ve	0
1	3.487	You do not think aids needed. (22)	6%	94%	0%
2	3.333	Hearing aids are only for most severe problems. (32)	8%	92%	0%
3	2.974	You think hearing impairment is normal for elderly. (51)	15%	85%	0%
4	2.763	Another ear can help hearing. (50)	41%	56%	3%
5	2.514	You cannot afford to buy a hearing aid. (28)	44%	51%	5%
6	2.457	Hearing aids are inconvenient to wear. (4)	49%	41%	10%
7	2.395	Hearing aids are expensive. (1)	59%	38%	3%
8	2.353	Hearing aids are troublesome to use wear. (6)	61%	26%	13%
9	2.313	Hearing aids are uncomfortable to wear. (5)	56%	26%	18%
10	2.282	Hearing impairment is not a serious medical problem. (46)	56%	44%	0%
11	2.276	Hearing aids will make sounds unnatural. (13)	54%	20%	26%
12	2.226	Hearing aids will make sounds too loud and bring discomfort. (11)	60%	20%	20%
13	2.214	Doctor does not think aids needed. (25)	51%	21%	28%

14	2.185	Hearing aids will bring feedback. (12)	54%	15%	31%
15	2.172	Hearing aids often have malfunction. (10)	56%	18%	26%
16	2.161	Hearing aids can only be used in particular environments. (15)	67%	13%	20%
17	2.143	Hearing aids will bring noise annoyance. (14)	57%	15%	28%
18	2.139	Dispensers' service is not good. (43)	74%	18%	8%
19	2.135	Dispensers are not professional enough. (42)	74%	21%	5%
20	2.121	Hearing aids have inflexible volume control. (16)	70%	15%	15%
21a	2.108	There is insufficient information/instruction given by dispensers (in store). (41)	74%	21%	5%
21b	2.108	Your family does not think aids needed. (23)	74%	21%	5%
21c	2.108	Dispensers use deceptive practice. (45)	80%	15%	5%
24	2.103	You are afraid of making wrong choice. (21)	79%	21%	0%
25	2.077	You do not know how to choose a suitable one. (18)	79%	21%	0%
26	2.069	Wearing hearing aids will make you feel nervous. (49)	61%	13%	26%
27	2.067	Hearing aids require expensive repair cost. (9)	64%	13%	23%
28	2.054	Dispensers use high pressure of selling. (44)	85%	10%	5%
29a	2.051	You do not know where to buy. (19)	82%	18%	0%
29b	2.051	You do not know how to manipulate. (20)	82%	18%	0%

31a	2.036	Hearing aids are difficult to manipulate. (7)	59%	13%	28%
31b	2.036	Wearing hearing aids can cause other ailments. (17)	62%	10%	28%
33	2.032	Hearing aids require expensive battery. (8)	67%	13%	20%
34	2.026	You think you will not live long enough. (47)	74%	23%	3%
35	2.000	Difficult to reach a hearing centre. (48)	87%	13%	0%
36	1.966	You have heard about poor experience from others using hearing aids. (40)	69%	5%	26%
37	1.947	Your friends do not think aids needed. (24)	87%	10%	3%
38	1.919	Hearing aids are small and easy to lose. (2)	87%	8%	5%
39	1.914	You think words are still unclear after wearing hearing aids. (27)	80%	10%	10%
40a	1.897	Wearing hearing aids will make you feel inferior to other elderly. (34)	85%	15%	0%
40b	1.897	You do not want to disclose having hearing impairment. (33)	87%	13%	0%
42	1.895	Hearing aids are not good-looking. (3)	85%	13%	2%
43a	1.872	Wearing hearing aids is a sign of weakness. (30)	92%	8%	0%
43b	1.872	Wearing hearing aids is a sign of handicap. (31)	92%	8%	0%
45	1.846	You worry family will think you are inferior after	90%	10%	0%

		using. (35)			
46	1.833	You do not think hearing aids can help. (26)	84%	8%	8%
47a	1.821	You worry friends will think you are inferior after using. (36)	90%	10%	0%
47b	1.821	Wearing hearing aids is a sign of aging. (29)	95%	5%	0%
49a	1.718	You worry wearing hearing aids will make your family feel ashamed. (38)	95%	5%	0%
49b	1.718	You worry wearing hearing aids will make your friends feel ashamed. (39)	95%	5%	0%
51	1.692	Wearing hearing aids will make you feel ashamed. (37)	92%	8%	0%

Key: +ve = Positive response; -ve = Negative response; 0 = No Comment.

Appendix B4

Ranked Reasons for Rejection of Hearing aid use among the Old Old Participants.

Rank	Mean	Reason (Questionnaire item)	-ve	+ve	0
1	3.422	You do not think aids needed. (22)	11%	89%	0%
2	3.267	Hearing aids are only for most severe problems. (32)	9%	91%	0%
3	2.932	You think hearing impairment is normal for elderly. (51)	23%	75%	2%
4	2.907	Hearing aids are troublesome to use wear. (6)	38%	58%	4%
5	2.841	Another ear can help hearing. (50)	36%	62%	2%
6	2.800	You cannot afford to buy a hearing aid. (28)	49%	51%	0%
7	2.778	Hearing aids are inconvenient to wear. (4)	42%	58%	0%
8	2.756	Hearing aids are uncomfortable to wear. (5)	38%	53%	9%
9	2.750	Hearing aids will bring noise annoyance. (14)	31%	40%	29%
10	2.742	Hearing aids will bring feedback. (12)	31%	38%	31%
11	2.727	Hearing aids are expensive. (1)	49%	49%	2%
12a	2.500	Hearing aids will make sounds unnatural. (13)	35%	35%	30%
12b	2.500	Hearing aids will make sounds too loud and bring discomfort. (11)	44%	36%	20%
14	2.486	Hearing aids are difficult to manipulate. (7)	47%	35%	18%

15	2.382	Hearing aids often have malfunction. (10)	50%	25%	25%
16	2.378	Hearing aids can only be used in particular environments. (15)	53%	29%	18%
17	2.372	Hearing aids are small and easy to lose. (2)	58%	38%	4%
18	2.357	You do not know how to manipulate. (20)	60%	33%	7%
19	2.353	Doctor does not think aids needed. (25)	49%	27%	24%
20a	2.341	You are afraid of making wrong choice. (21)	65%	33%	2%
20b	2.341	You think you will not live long enough. (47)	65%	33%	2%
22	2.333	Hearing aids require expensive repair cost. (9)	53%	27%	20%
23	2.295	You do not know where to buy. (19)	71%	27%	2%
24	2.286	You do not know how to choose a suitable one. (18)	60%	33%	7%
25	2.270	Hearing aids have inflexible volume control. (16)	55%	27%	18%
26a	2.256	Hearing aids require expensive battery. (8)	62%	25%	13%
26b	2.256	You have heard about poor experience from others using hearing aids. (40)	71%	25%	4%
28	2.205	Hearing impairment is not a serious medical problem. (46)	65%	33%	2%
29	2.161	You think words are still unclear after wearing hearing aids. (27)	47%	22%	31%

30	2.140	Difficult to reach a hearing centre. (48)	78%	18%	4%
31	2.105	Dispensers are not professional enough. (42)	67%	18%	15%
32	2.095	Wearing hearing aids will make you feel nervous. (49)	75%	18%	7%
33	2.086	You do not think hearing aids can help. (26)	60%	18%	22%
34	2.079	There is insufficient information/instruction given by dispensers (in store). (41)	67%	18%	15%
35	2.070	Your family does not think aids needed. (23)	76%	20%	4%
36	2.059	Wearing hearing aids can cause other ailments. (17)	65%	11%	24%
37a	2.053	Dispensers use high pressure of selling. (44)	70%	15%	15%
37b	2.053	Dispensers use deceptive practice. (45)	70%	15%	15%
39	2.045	Your friends do not think aids needed. (24)	82%	16%	2%
40	2.026	Dispensers' service is not good. (43)	70%	15%	15%
41	1.977	Wearing hearing aids is a sign of handicap. (31)	78%	20%	2%
42	1.932	Wearing hearing aids will make you feel inferior to other elderly. (34)	82%	16%	2%
43a	1.909	You do not want to disclose having hearing impairment. (33)	80%	18%	2%
43b	1.909	Wearing hearing aids is a sign of aging. (29)	85%	13%	2%
45	1.886	Wearing hearing aids is a sign of weakness. (30)	85%	13%	2%

46	1.881	Hearing aids are not good-looking. (3)	88%	6%	6%
47	1.864	You worry friends will think you are inferior after using. (36)	85%	13%	2%
48	1.841	You worry family will think you are inferior after using. (35)	85%	13%	2%
49	1.818	Wearing hearing aids will make you feel ashamed. (37)	87%	11%	2%
50	1.773	You worry wearing hearing aids will make your family feel ashamed. (38)	89%	9%	2%
51	1.750	You worry wearing hearing aids will make your friends feel ashamed. (39)	89%	9%	2%

Key: +ve = Positive response; -ve = Negative response; 0 = No Comment.

Appendix B5

Ranked Reasons for Rejection of Hearing aid use among the Oldest Old Participants.

Rank	Mean	Reason (Questionnaire item)	-ve	+ve	0
1	3.364	You do not think aids needed. (22)	0%	100%	0%
2	3.273	Hearing aids are only for most severe problems. (32)	9%	91%	0%
3	3.200	Hearing aids are uncomfortable to wear. (5)	27%	64%	9%
4	3.091	You think hearing impairment is normal for elderly. (51)	9%	91%	0%
5	2.909	Hearing impairment is not a serious medical problem. (46)	18%	82%	0%
6a	2.900	You cannot afford to buy a hearing aid. (28)	36%	55%	9%
6b	2.900	Hearing aids are troublesome to use wear. (6)	27%	64%	9%
8a	2.818	You think you will not live long enough. (47)	36%	64%	0%
8b	2.818	Another ear can help hearing. (50)	18%	82%	0%
10a	2.800	Hearing aids are expensive. (1)	36%	55%	9%
10b	2.800	Hearing aids are inconvenient to wear. (4)	36%	55%	9%
12	2.600	You do not know how to choose a suitable one. (18)	45%	45%	10%
13	2.444	You are afraid of making wrong choice. (21)	46%	36%	18%
14	2.400	Hearing aids are small and easy to lose. (2)	64%	27%	9%

15a	2.375	Hearing aids will make sounds too loud and bring discomfort. (11)	46%	27%	27%
15b	2.375	You think words are still unclear after wearing hearing aids. (27)	55%	18%	27%
17	2.286	Hearing aids will bring noise annoyance. (14)	46%	18%	36%
18a	2.273	Hearing aids are difficult to manipulate. (7)	64%	36%	0%
18b	2.273	Wearing hearing aids is a sign of aging. (29)	82%	18%	0%
18c	2.273	Wearing hearing aids is a sign of weakness. (30)	82%	18%	0%
18b	2.273	Wearing hearing aids is a sign of handicap. (31)	82%	18%	0%
22a	2.250	Hearing aids will bring feedback. (12)	46%	27%	27%
22b	2.250	Hearing aids will make sounds unnatural. (13)	46%	27%	27%
22c	2.250	Difficult to reach a hearing centre. (48)	46%	27%	27%
22d	2.250	You do not think hearing aids can help. (26)	64%	9%	27%
26	2.222	Hearing aids require expensive battery. (8)	55%	27%	18%
27a	2.200	Hearing aids require expensive repair cost. (9)	64%	27%	9%
27b	2.200	Hearing aids often have malfunction. (10)	64%	27%	9%
27c	2.200	You do not know where to buy. (19)	64%	27%	9%
27d	2.200	You have heard about poor experience from others using hearing aids. (40)	73%	18%	9%

31	2.125	Hearing aids have inflexible volume control. (16)	55%	18%	27%
32	2.111	You do not know how to manipulate. (20)	64%	18%	18%
33a	2.091	Your family does not think aids needed. (23)	73%	27%	0%
33b	2.091	Wearing hearing aids will make you feel inferior to other elderly. (34)	82%	18%	0%
33c	2.091	Wearing hearing aids will make you feel nervous. (49)	82%	18%	0%
36a	2.000	Hearing aids can only be used in particular environments. (15)	64%	9%	27%
36b	2.000	You do not want to disclose having hearing impairment. (33)	91%	9%	0%
38a	1.909	Hearing aids are not good-looking. (3)	91%	9%	0%
38b	1.909	Wearing hearing aids will make you feel ashamed. (37)	91%	9%	0%
40	1.900	Your friends do not think aids needed. (24)	82%	9%	9%
41a	1.857	Wearing hearing aids can cause other ailments. (17)	55%	9%	36%
41b	1.857	Doctor does not think aids needed. (25)	55%	9%	36%
43a	1.818	You worry family will think you are inferior after using. (35)	91%	9%	0%

43b	1.818	You worry friends will think you are inferior after using. (36)	91%	9%	0%
43c	1.818	You worry wearing hearing aids will make your family feel ashamed. (38)	100%	0%	0%
43d	1.818	You worry wearing hearing aids will make your friends feel ashamed. (39)	100%	0%	0%
47a	1.800	There is insufficient information/instruction given by dispensers (in store). (41)	91%	0%	9%
47b	1.800	Dispensers are not professional enough. (42)	91%	0%	9%
47c	1.800	Dispensers' service is not good. (43)	91%	0%	9%
47d	1.800	Dispensers use high pressure of selling. (44)	91%	0%	9%
47e	1.800	Dispensers use deceptive practice. (45)	91%	0%	9%

Key: +ve = Positive response; -ve = Negative response; 0 = No Comment.

Appendix B6

Ranked Reasons for Rejection of Hearing aid use among the Unilaterally Hearing-impaired Participants.

Rank	Mean	Reason (Questionnaire item)	-ve	+ve	0
1	3.556	You do not think aids needed. (22)	0%	100%	0%
2	3.529	Another ear can help hearing. (50)	5%	90%	5%
3	3.500	Hearing aids are only for most severe problems. (32)	11%	89%	0%
4	3.111	You think hearing impairment is normal for elderly. (51)	17%	83%	0%
5	2.813	Hearing aids are inconvenient to wear. (4)	39%	50%	11%
6	2.647	Hearing aids are uncomfortable to wear. (5)	50%	44%	6%
7	2.588	Hearing aids are troublesome to use wear. (6)	56%	39%	5%
8a	2.538	Hearing aids often have malfunction. (10)	39%	33%	28%
8b	2.538	Hearing aids will make sounds unnatural. (13)	39%	33%	28%
8c	2.538	Hearing aids will bring noise annoyance. (14)	44%	28%	28%
11	2.500	You are afraid of making wrong choice. (21)	56%	44%	0%
12a	2.471	Hearing aids are expensive. (1)	50%	44%	6%
12b	2.471	You cannot afford to buy a hearing aid. (28)	50%	44%	6%
14	2.462	Hearing aids will bring feedback. (12)	44%	28%	28%

15	2.444	You do not know how to choose a suitable one. (18)	56%	44%	0%
16	2.385	Hearing aids require expensive repair cost. (9)	44%	28%	28%
17	2.333	Hearing aids will make sounds too loud and bring discomfort. (11)	61%	22%	17%
18a	2.313	Hearing aids are difficult to manipulate. (7)	61%	28%	11%
18b	2.313	Hearing aids have inflexible volume control. (16)	61%	28%	11%
20a	2.308	You have heard about poor experience from others using hearing aids. (40)	56%	16%	28%
20b	2.308	Wearing hearing aids will make you feel nervous. (49)	56%	16%	28%
22a	2.278	You do not know where to buy. (19)	67%	33%	0%
22b	2.278	You do not know how to manipulate. (20)	72%	28%	0%
22c	2.278	Hearing impairment is not a serious medical problem. (46)	61%	39%	0%
25	2.267	Hearing aids can only be used in particular environments. (15)	61%	22%	17%
26	2.250	Hearing aids require expensive battery. (8)	61%	28%	11%
27	2.200	Dispensers’ service is not good. (43)	68%	16%	16%
28	2.133	Doctor does not think aids needed. (25)	61%	22%	17%
29a	2.125	There is insufficient information/instruction given by	72%	17%	11%

		dispensers (in store). (41)			
29b	2.125	Dispensers are not professional enough. (42)	72%	17%	11%
29c	2.125	Dispensers use deceptive practice. (45)	72%	17%	11%
32	2.118	You think words are still unclear after wearing hearing aids. (27)	67%	28%	5%
33a	2.111	You think you will not live long enough. (47)	72%	28%	0%
33b	2.111	Difficult to reach a hearing centre. (48)	83%	17%	0%
35	2.063	Dispensers use high pressure of selling. (44)	78%	11%	11%
36	2.059	Your family does not think aids needed. (23)	83%	11%	6%
37a	2.056	Hearing aids are small and easy to lose. (2)	78%	22%	0%
37b	2.056	Your friends do not think aids needed. (24)	78%	22%	0%
37c	2.056	Wearing hearing aids is a sign of aging. (29)	83%	17%	0%
40a	2.000	You do not think hearing aids can help. (26)	83%	17%	0%
40b	2.000	Wearing hearing aids is a sign of weakness. (30)	89%	11%	0%
40c	2.000	Wearing hearing aids is a sign of handicap. (31)	83%	17%	0%
40d	2.000	Wearing hearing aids can cause other ailments. (17)	61%	6%	33%
44	1.944	You do not want to disclose having hearing impairment. (33)	83%	17%	0%
45	1.889	Hearing aids are not good-looking. (3)	89%	11%	0%

46a	1.833	Wearing hearing aids will make you feel inferior to other elderly. (34)	89%	11%	0%
46b	1.833	You worry friends will think you are inferior after using. (36)	89%	11%	0%
48	1.778	You worry family will think you are inferior after using. (35)	89%	11%	0%
49a	1.722	Wearing hearing aids will make you feel ashamed. (37)	89%	11%	0%
49b	1.722	You worry wearing hearing aids will make your family feel ashamed. (38)	94%	6%	0%
51	1.667	You worry wearing hearing aids will make your friends feel ashamed. (39)	94%	6%	0%

Key: +ve = Positive response; -ve = Negative response; 0 = No Comment.

Appendix B7

Ranked Reasons for Rejection of Hearing aid use among the Bilaterally Hearing-impaired Participants.

Rank	Mean	Reason (Questionnaire item)	-ve	+ve	0
1	3.416	You do not think aids needed. (22)	9%	91%	0%
2	3.247	Hearing aids are only for most severe problems. (32)	8%	92%	0%
3	2.934	You think hearing impairment is normal for elderly. (51)	18%	81%	1%
4	2.747	You cannot afford to buy a hearing aid. (28)	44%	53%	3%
5	2.714	Hearing aids are troublesome to use wear. (6)	44%	47%	9%
6	2.645	Another ear can help hearing. (50)	43%	56%	1%
7	2.636	Hearing aids are uncomfortable to wear. (5)	43%	43%	14%
8	2.627	Hearing aids are expensive. (1)	52%	45%	3%
9	2.622	Hearing aids are inconvenient to wear. (4)	45%	51%	4%
10	2.453	Hearing aids will bring feedback. (12)	42%	27%	31%
11	2.426	Hearing aids will bring noise annoyance. (14)	43%	27%	30%
12	2.383	Hearing aids will make sounds too loud and bring discomfort. (11)	48%	30%	22%
13	2.339	Hearing aids will make sounds unnatural. (13)	46%	27%	27%

14	2.329	Hearing impairment is not a serious medical problem. (46)	55%	44%	1%
15	2.307	You think you will not live long enough. (47)	64%	34%	2%
16	2.283	Hearing aids are difficult to manipulate. (7)	52%	26%	22%
17	2.278	Doctor does not think aids needed. (25)	48%	22%	30%
18	2.246	Hearing aids can only be used in particular environments. (15)	60%	19%	21%
19	2.222	Hearing aids are small and easy to lose. (2)	69%	25%	6%
20	2.217	Hearing aids often have malfunction. (10)	58%	20%	22%
21	2.189	You are afraid of making wrong choice. (21)	71%	25%	4%
22	2.181	You do not know how to manipulate. (20)	69%	25%	6%
23	2.178	You do not know how to choose a suitable one. (18)	69%	26%	5%
24	2.175	Hearing aids require expensive repair cost. (9)	62%	20%	18%
25	2.161	Hearing aids have inflexible volume control. (16)	60%	20%	20%
26	2.160	You do not know where to buy. (19)	77%	21%	2%
27	2.143	Hearing aids require expensive battery. (8)	64%	18%	18%
28	2.116	You have heard about poor experience from others using hearing aids. (40)	74%	16%	10%
29	2.095	Your family does not think aids needed. (23)	73%	23%	4%

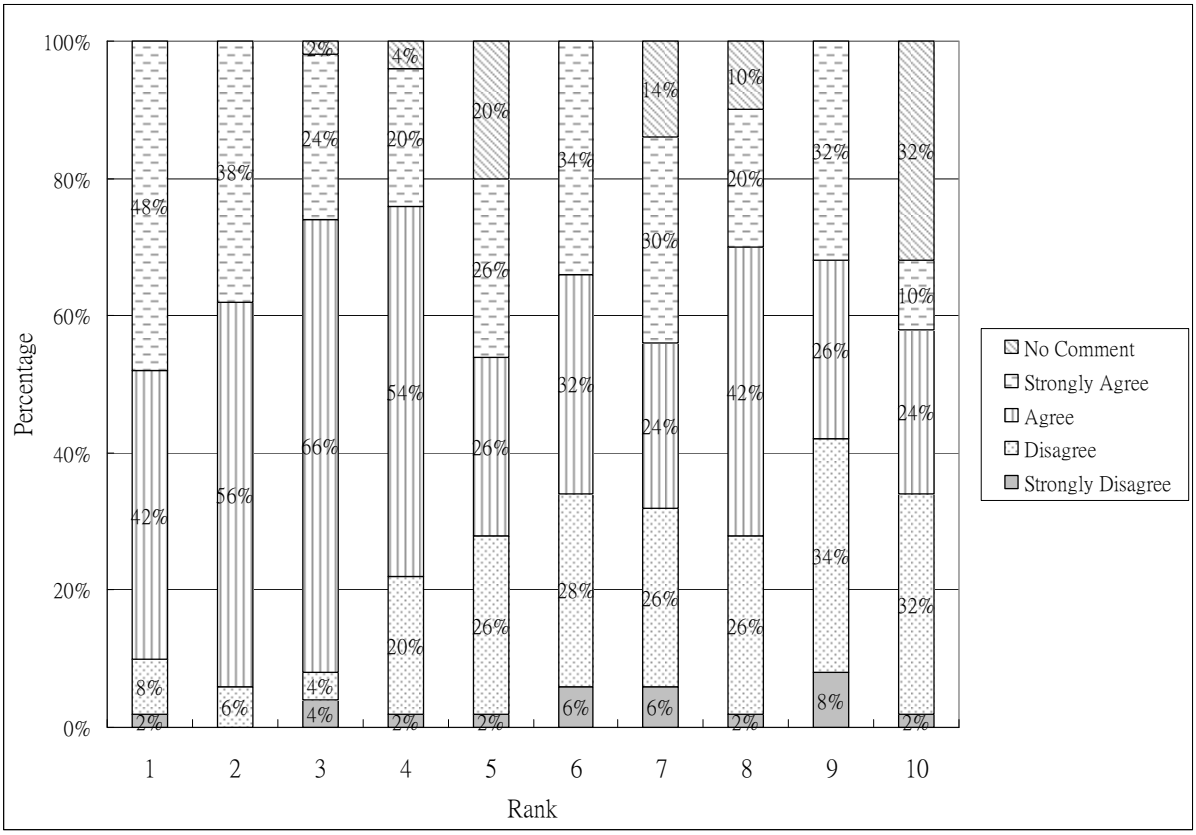
30	2.083	Difficult to reach a hearing centre. (48)	77%	17%	6%
31	2.072	Dispensers are not professional enough. (42)	73%	17%	10%
32	2.053	You think words are still unclear after wearing hearing aids. (27)	60%	14%	26%
33a	2.043	There is insufficient information/instruction given by dispensers (in store). (41)	73%	17%	10%
33b	2.043	Wearing hearing aids will make you feel nervous. (49)	74%	16%	10%
35	2.035	Wearing hearing aids can cause other ailments. (17)	62%	12%	26%
36	2.029	Dispensers use deceptive practice. (45)	77%	13%	10%
37a	2.014	Dispensers use high pressure of selling. (44)	78%	12%	10%
37b	2.014	Dispensers' service is not good. (43)	75%	14%	11%
39	1.984	You do not think hearing aids can help. (26)	68%	11%	21%
40	1.973	Your friends do not think aids needed. (24)	86%	10%	4%
41a	1.961	Wearing hearing aids is a sign of handicap. (31)	84%	14%	2%
41b	1.961	Wearing hearing aids will make you feel inferior to other elderly. (34)	82%	17%	1%
43a	1.908	Wearing hearing aids is a sign of weakness. (30)	87%	12%	1%
43b	1.908	You do not want to disclose having hearing impairment. (33)	84%	14%	2%

45	1.890	Hearing aids are not good-looking. (3)	86%	9%	5%
46	1.882	Wearing hearing aids is a sign of aging. (29)	90%	9%	1%
47	1.855	You worry family will think you are inferior after using. (35)	87%	12%	1%
48	1.842	You worry friends will think you are inferior after using. (36)	87%	12%	1%
49	1.789	Wearing hearing aids will make you feel ashamed. (37)	90%	9%	1%
50a	1.763	You worry wearing hearing aids will make your family feel ashamed. (38)	92%	7%	1%
50b	1.763	You worry wearing hearing aids will make your friends feel ashamed. (39)	92%	7%	1%

Key: +ve = Positive response; -ve = Negative response; 0 = No Comment.

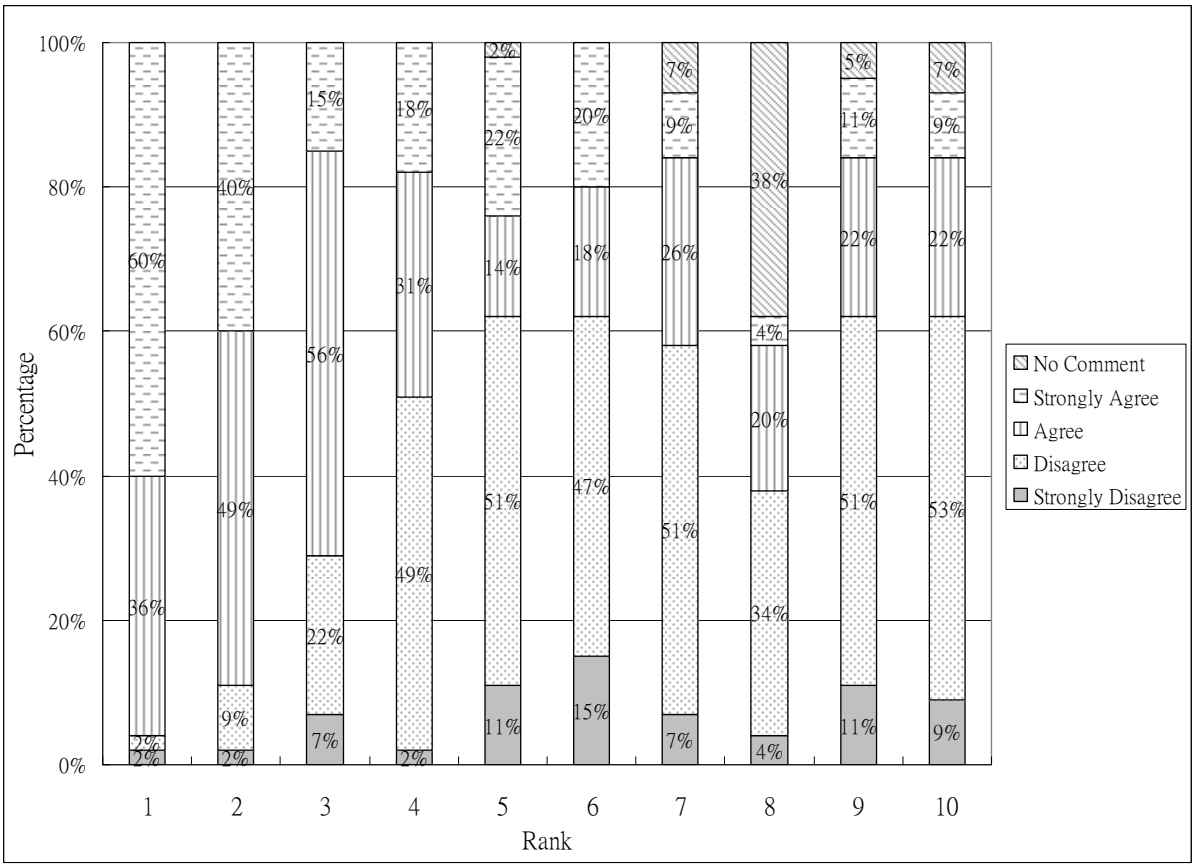
Appendix C1

Distribution of Ratings among Top Ten Reasons by Female Participants.



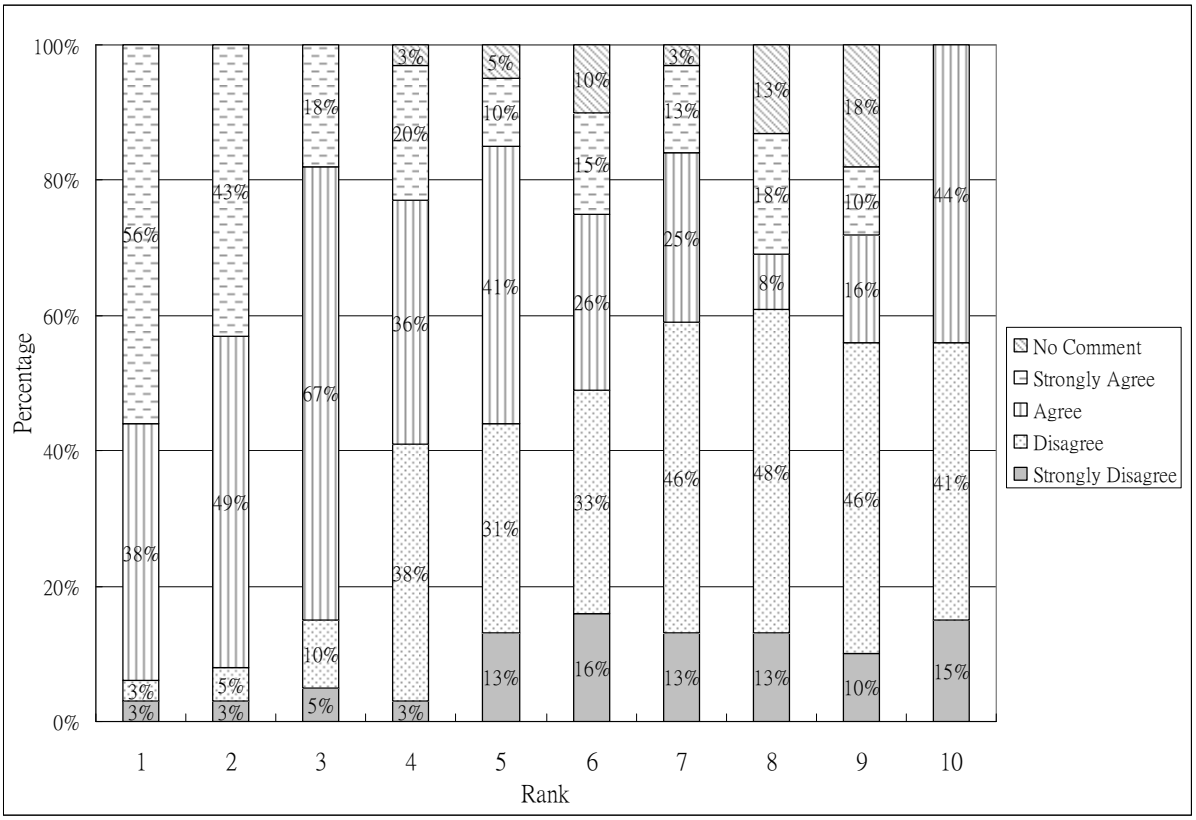
Appendix C2

Distribution of Ratings among Top Ten Reasons by Male Participants.



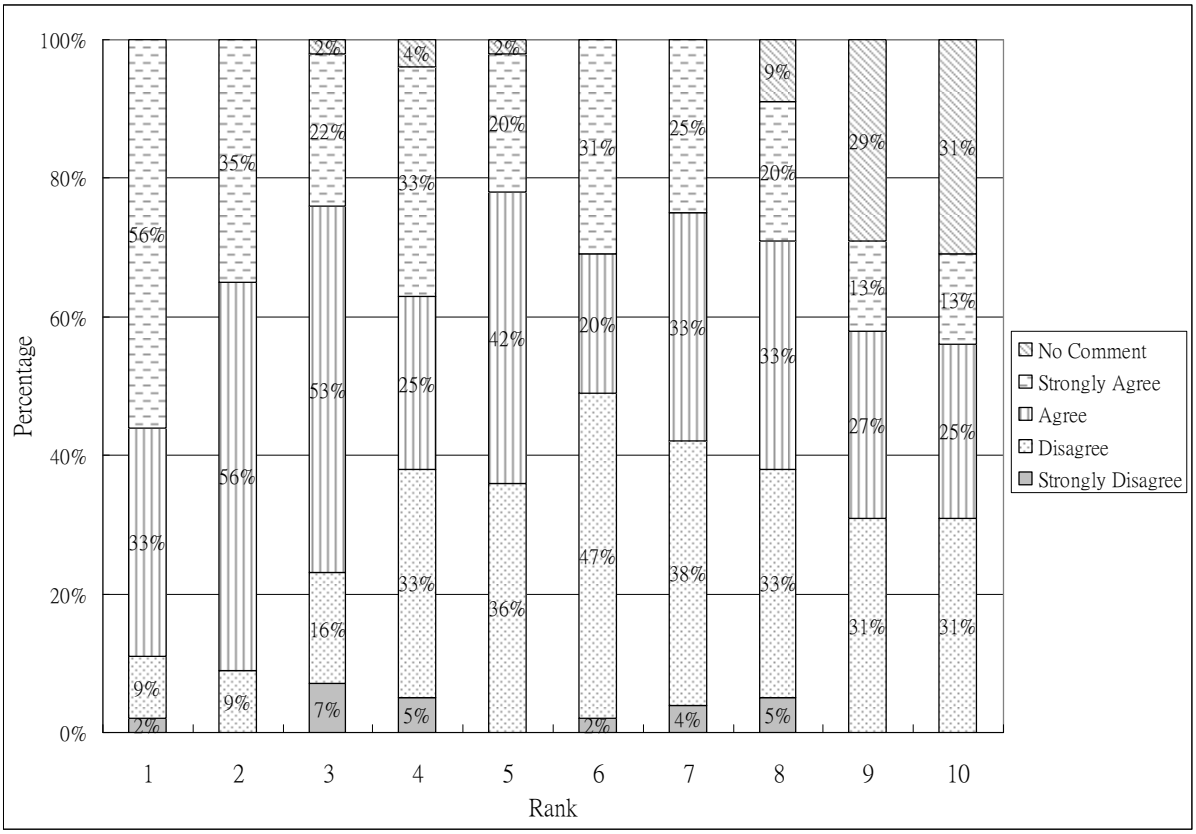
Appendix C3

Distribution of Ratings among Top Ten Reasons by the Young Old Participants.



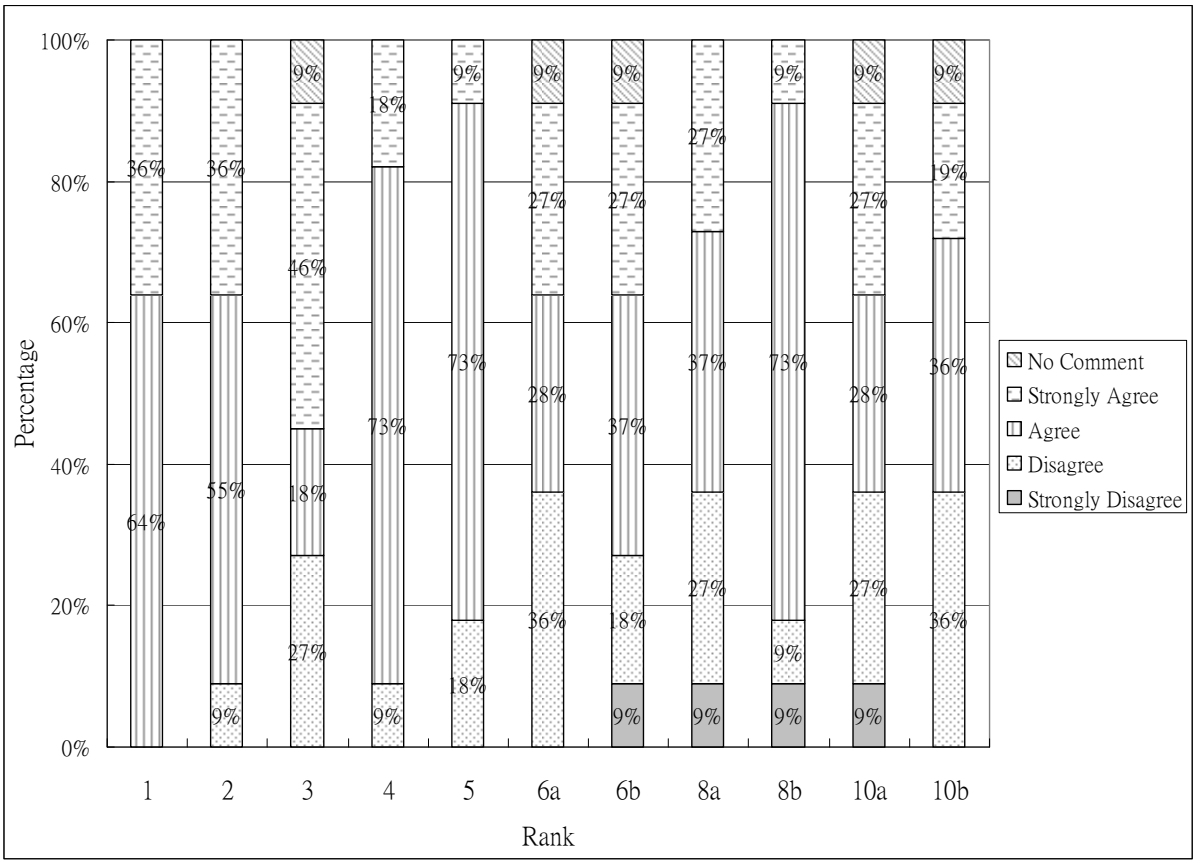
Appendix C4

Distribution of Ratings among Top Ten Reasons by the Old Old Participants.



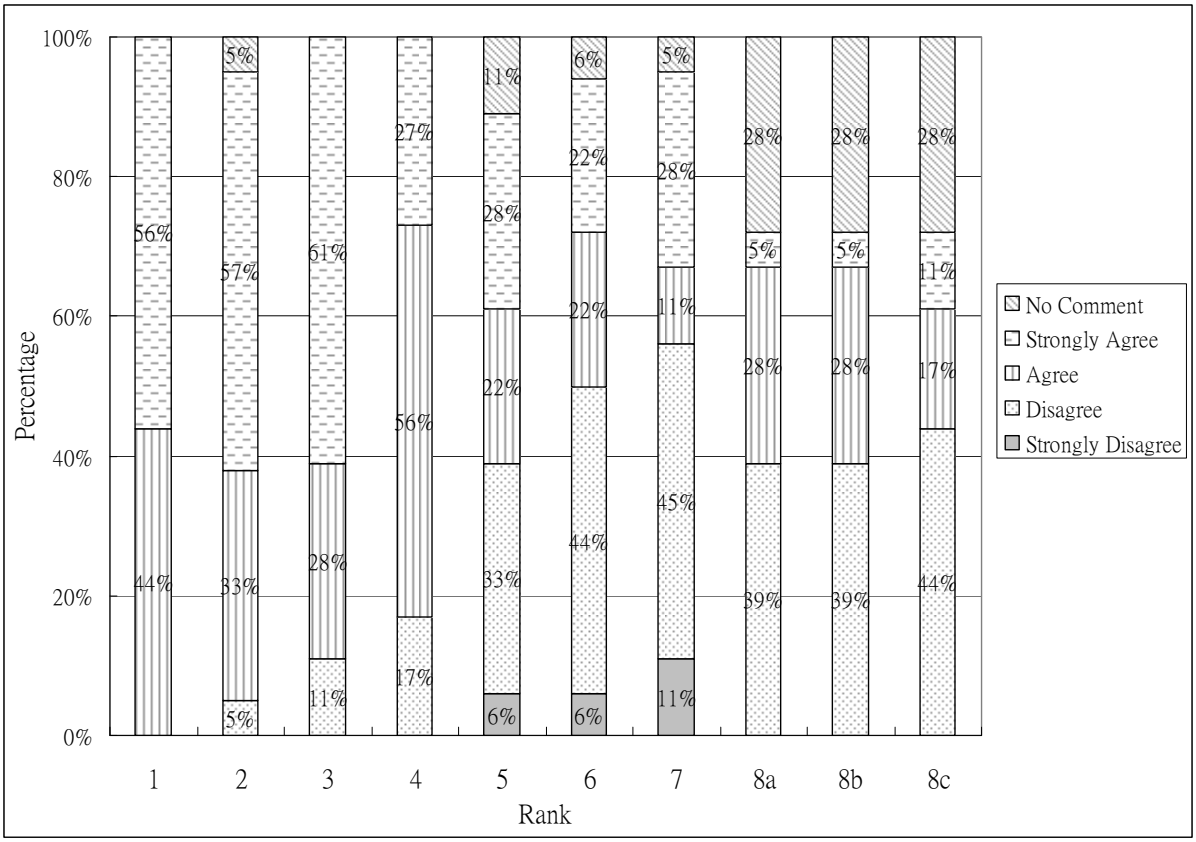
Appendix C5

Distribution of Ratings among Top Ten Reasons by the Oldest Old Participants.



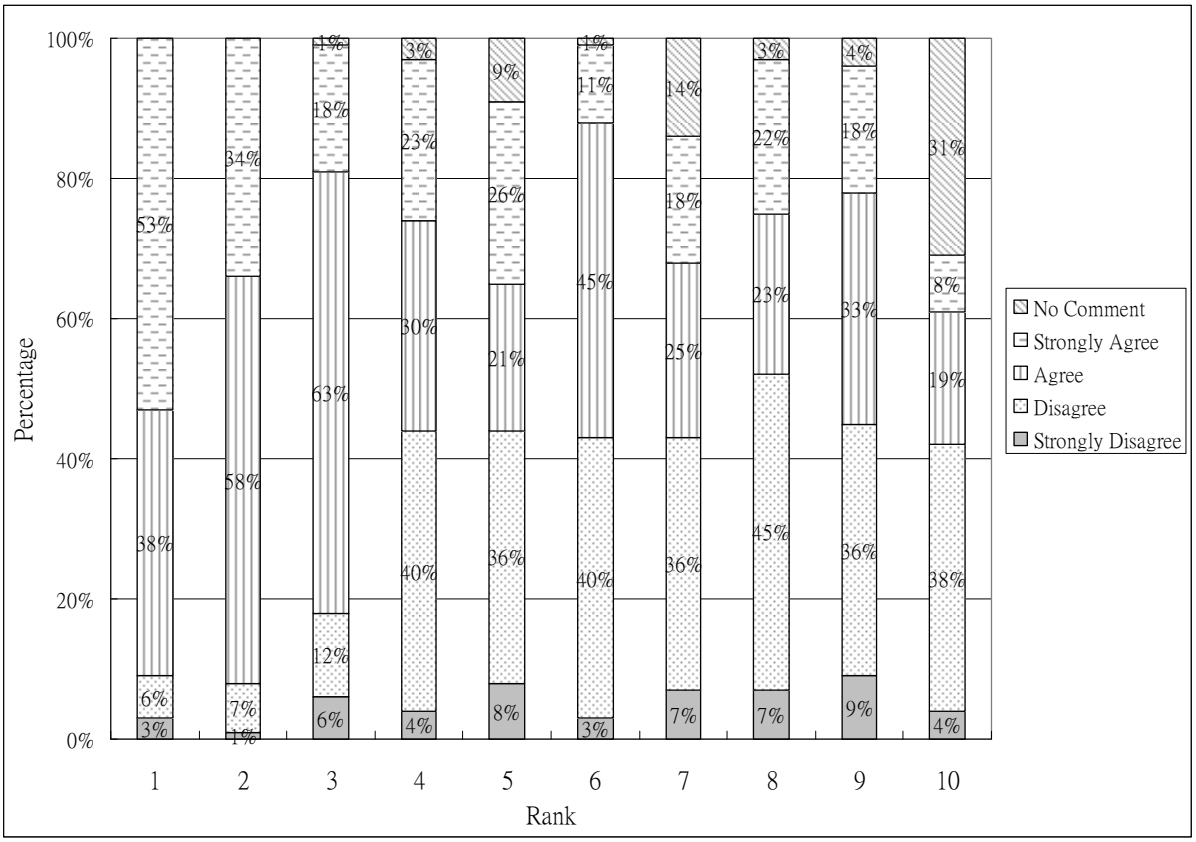
Appendix C6

Distribution of Ratings among Top Ten Reasons by the Unilaterally Hearing-impaired Participants.



Appendix C7

Distribution of Ratings among Top Ten Reasons by the Bilaterally Hearing-impaired Participants.



Appendix D

Chinese Version of the self-developed 51-item Questionnaire.

不欲/拒絕戴助聽器的可能性原因:	無意見	極不同意	不同意	同意	極同意
1) 助聽器很昂貴.	0	1	2	3	4
2) 助聽器體積小,容易遺失.	0	1	2	3	4
3) 助聽器外形不美觀.	0	1	2	3	4
4) 戴助聽器很不方便.	0	1	2	3	4
5) 戴助聽器很不舒服.	0	1	2	3	4
6) 戴助聽器很麻煩.	0	1	2	3	4
7) 很難操作助聽器.	0	1	2	3	4
8) 助聽器的電池很昂貴.	0	1	2	3	4
9) 助聽器的維修費用昂貴.	0	1	2	3	4
10) 助聽器容易發生故障.	0	1	2	3	4
11) 助聽器會令聲音過大而導致不舒服.	0	1	2	3	4
12) 助聽器會帶來回音.	0	1	2	3	4
13) 助聽器會令聲音不自然.	0	1	2	3	4
14) 助聽器會帶來噪音滋擾.	0	1	2	3	4

15) 助聽器只能在某些環境適用.	0	1	2	3	4
16) 很難調較助聽器的音量.	0	1	2	3	4
17) 戴助聽器會引起身體其他毛病.	0	1	2	3	4
18) 你不知道如何選擇合適的助聽器.	0	1	2	3	4
19) 你不知道在哪兒購買助聽器.	0	1	2	3	4
20) 你不知道如何使用助聽器.	0	1	2	3	4
21) 你擔心選錯助聽器.	0	1	2	3	4
22) 你認爲你無需要配戴助聽器.	0	1	2	3	4
23) 你家人認爲你無需要配戴助聽器.	0	1	2	3	4
24) 你朋友認爲你無需要配戴助聽器.	0	1	2	3	4
25) 醫生認爲你無需要戴助聽器.	0	1	2	3	4
26) 你認爲配戴助聽器沒有幫助.	0	1	2	3	4
27) 你認爲配戴助聽器後仍聽不清楚.	0	1	2	3	4
28) 你負擔不起購買助聽器.	0	1	2	3	4
29) 配戴助聽器表示年紀大.	0	1	2	3	4
30) 配戴助聽器表示身體虛弱.	0	1	2	3	4
31) 配戴助聽器表示有缺陷.	0	1	2	3	4
32) 聽覺問題嚴重才需要配戴助聽器.	0	1	2	3	4
33) 你不欲揭露你的聽力有問題.	0	1	2	3	4

34) 配戴助聽器使你覺得比其他老人遜色.	0	1	2	3	4
35) 你擔心配戴助聽器後家人會覺得你比以前遜色.	0	1	2	3	4
36) 你擔心配戴助聽器後朋友會覺得你比以前遜色.	0	1	2	3	4
37) 配戴助聽器會令你感到羞恥/丟臉.	0	1	2	3	4
38) 配戴助聽器會令你家人感到羞恥/丟臉.	0	1	2	3	4
39) 配戴助聽器會令你朋友感到羞恥/丟臉..	0	1	2	3	4
40) 你曾從別人身上聽過配戴助聽器的不愉快經驗.	0	1	2	3	4
41) (配售助聽器的) 銷售員沒有提供足夠資料.	0	1	2	3	4
42) 銷售員不夠專業.	0	1	2	3	4
43) 銷售員的服務差.	0	1	2	3	4
44) 銷售員施壓推銷.	0	1	2	3	4
45) 銷售員以欺騙手法推銷.	0	1	2	3	4
46) 弱聽或失聰並不是嚴重問題.	0	1	2	3	4
47) 你認爲你在世日子不多.	0	1	2	3	4
48) 很難到達聽覺中心.	0	1	2	3	4
49) 配戴助聽器使你緊張.	0	1	2	3	4
50) 可靠另一隻耳朵聆聽.	0	1	2	3	4
51) 老年弱聽/失聰是正常的.	0	1	2	3	4